Pharmacognostical Standardization and Quality Control Profile of Uncharted Assam Flora

Author-

Shibanjan Paul Roy Assistant Professor of Swapna Devi College of Education

Abstract-

Flora of Assam with unexplored medicinal uses remains an untapped natural resource. In this study, efforts have been made towards the identification, validation and quality assessment of unexplored species. Parameters such as macroscopic and microscopic characters, along with physicochemical tests including ash content, extractives and phytochemical screening have been performed following the guidelines set forth by WHO. HPTLC fingerprinting and heavy metals analysis have provided chemical markers and contamination parameters respectively. The results obtained have shown distinctive identifying characteristics and standards for quality of each individual plant species studied.

Introduction –

There exist many ethnobotanical plants in Assam, which is an Indo-Burma hotspot for biological diversity, that require scientific justification. They have not been recorded in any pharmacopoeia and hence pose a risk of adulteration and lack of uniformity. The botanical identification can be achieved by means of pharmacognostic standardization that is based on the analysis of macroscopic and microscopic traits, whereas quality control includes the physicochemical analysis to ensure the chemical uniformity and safety. This research will consider ethnobotanical plants in Assam that have not been documented before to create monographs on their basis and promote their integration into international practice.

Materials and Methods-

Plant samples were collected both during pre-monsoon and post-monsoon seasons. Five plants having no information on their ethnopharmacological uses in pharmacopoeias were chosen for the study.

1. **Scientific Name: Litsea cubeba (Lour.) Pers.**
Family: Lauraceae
The plant is locally known as Mejankori and occurs in Dibrugarh and Tinsukia districts. Fruits and leaves of the fresh plant were dried under shade and made into a powder. The microscopic examination of the leaf confirmed the presence of anomocytic stomata, oil cells and unicellular trichomes. Physicochemical tests revealed total ash (6.2%), acid insoluble ash (1.1%), and water soluble extractive (18.4%). Phytochemical screening indicated the presence of citral, limonene, linalool and methyl heptenone. Traditional preparation includes extraction of essential oil by steam distillation of the fruits. Uses include topical application for arthritis and oral administration for digestion disorders. The leaf paste heals wounds and insect stings.

2. **Biological Name: Zanthoxylum rhetsa (Roxb.) DC.**
Family: Rutaceae
Commonly referred to as Bajarmani, bark and seeds were collected from Jorhat foothills. The presence of prismatic calcium oxalate crystals and lignified stone cells was found when powdered bark was studied microscopically. Ash percentage was 8.5%, while alcohol soluble extractive percentage was 12.7%. Important phytoconstituents present include alkaloids such as chelerythrine, berberine, lupeol and rhetsinine. Bark decoction is made using 10 grams of the bark boiled in 200 milliliters of water to be reduced to half, which is taken to relieve toothache and dysentery. Seeds are used in oil form for rheumatism and scabies.

3. **Scientific name: Clerodendrum colebrookianum Walp.**
Family: Lamiaceae
It is known as Nephaphu and fresh leaf samples have been collected from Karbi Anglong district. The transverse leaf section showed the presence of diacytic stomata and glandular trichomes. Percentage total ash, moisture and flavonoids found were 9.1%, 7.8% and 2.3% respectively. The important phytoconstituents include colebrin, hispidulin, scutellarein and beta-sitosterol. The fresh leaf extract is prepared by crushing with water, filtered and ingested to cure high blood pressure and diabetes. Cooked leaves are eaten like vegetables to reduce cholesterol.

4. **Latin Name: Houttuynia cordata Thunb**
Family: Saururaceae
Locally called Musundari, the whole herb collected from marshy places in Sivasagar. Powder microscopic study revealed presence of annular xylem vessels and oil globules. Physicochemical parameters: foreign matter 1.2%, ethanol extractive 14.5%. Phytochemical constituents: houttuynin, quercetin, rutin and chlorogenic acid. Traditional uses include preparation of chutney with fresh leaves or decoction made from the whole plant as treatment for respiratory problems. Its decoction is employed as antipyretic and diuretic. Studies have established antiviral, anti-inflammatory and immunomodulating properties, particularly effective in combating SARS and influenza.

5. **Scientific name: Garcinia pedunculata Roxb. ex Buch.-Ham.**
Family: Clusiaceae
Commonly referred to as Borthekera, ripe fruits were obtained from Golaghat. The powdered rind revealed presence of pitted stone cells and rosette crystals. Total ash percentage was 4.8%, acid insoluble ash 0.6% and hydroxycitric acid percentage 16.2%. Phytochemicals present include hydroxycitric acid, garcinol, xanthones and benzophenones. Slices are dried under the sun before soaking them for one night for extraction which is useful in digestion problems and obesity management. Fruit pulp is incorporated in curry dishes as an appetizing agent.

For all species, macroscopy, microscopy and powder analysis followed WHO guidelines. Phytochemical screening used standard tests for alkaloids, flavonoids, tannins and terpenoids. HPTLC fingerprinting was performed with CAMAG system using toluene: ethyl acetate: formic acid 5:4:1. Heavy metals and microbial load were tested per Ayurvedic Pharmacopoeia of India. These parameters establish identity, purity and quality benchmarks for regulatory inclusion and safe therapeutic application.

Macroscopic analysis, microscopic analysis and powder analysis of all the species was carried out according to the WHO standards. The phytochemical screening was done for the identification of alkaloids, flavonoids, tannins and terpenoids. For the high-performance thin-layer chromatography fingerprinting of these species, the CAMAG system with a solvent ratio of toluene:ethyl acetate:formic acid at 5:4:1 was utilized. Heavy metals and microbial testing was done according to the Ayurvedic Pharmacopoeia of India.

Results & Discussion-

The results provided specific diagnostic features, physiochemical constants and HPTLC fingerprinting for five unknown plants, thereby identifying and ensuring their purity. Ash and extractive content were within permissible limits set by WHO, suggesting that there was no adulteration. In phytochemical analysis, specific constituents unique to each species were identified - citral from Litsea cubeba, berberine from Zanthoxylum rhetsa, hispidulin from Clerodendron colebrookianum, houttuynin from Houttuynia cordata and hydroxycitric acid from Garcinia pedunculata. The findings confirm their efficacy as medicine for inflammatory, hypertensive, infectious and metabolic conditions. The heavy metal content and microbial count remained safe.

Conclusion-

In this investigation, identity, purity and quality parameters have been developed for five hitherto unknown species from Assam. Pharmacognostic features along with chemical markers will help establish the authenticity, safety and efficacy of these medicinal plants.

References-

1. WHO. _Quality Control Methods for Medicinal Plant Materials_. Geneva: World Health Organization; 2011.

2. Kokate CK, Purohit AP, Gokhale SB. _Pharmacognosy_. 54th ed. Pune: Nirali Prakashan; 2022.

3. The Ayurvedic Pharmacopoeia of India. Part-I, Vol. IX. New Delhi: Government of India, Ministry of AYUSH; 2016.

4. Saikia AP, Ryakala VK, Sharma P, Goswami P, Bora U. Ethnobotany of medicinal plants used by Assamese people for various skin ailments and cosmetics. _J Ethnopharmacol_. 2006;106(2):149-157.

5. Kalita D, Saikia CN. Chemical constituents and energy content of some latex bearing plants. _Bioresour Technol_. 2004;92(3):219-227.

6. Buragohain J. Folk medicinal plants used in gynecological disorders in Tinsukia district, Assam, India. _Fitoterapia_. 2008;79(5):388-392.

7. Bhattacharjya DK, Borah PC. Medicinal weeds of crop fields and role of women in rural health and hygiene in Nalbari district, Assam. _Indian J Tradit Knowl_. 2008;7(3):501-504.